OCTOBER 1985
ISSN 0226-9104

# FIRST-YEAR SURVIVAL AND DENSITIES OF 1981 PLANTATIONS

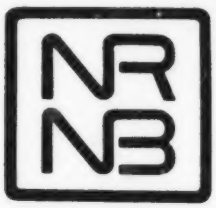
86-0712/

This report has been prepared by

DEPARTMENT OF FORESTS, MINES AND ENERGY
FREDERICTON, NEW BRUNSWICK

MINISTER: HON. M. MACLEOD

# FIRST YEAR SURVIVAL AND DENSITIES OF 1981 PLANTATIONS




"This is a Federal-Provincial Development Project, funded under the Forestry Subsidiary Agreement of the Canada - New Brunswick General Development Agreement by the Government of New Brunswick and the Department of Regional Economic Expansion."

Copies Available
by contacting:

Timber Management Branch
Department Forests, Mines and Energy
P.O. Box 6000
Fredericton, N.B.
E3B 5H1

Author: Timber Management Branch
Catalogue No: ISSN 0226-9104
Cover: Tim Fevens

## ABSTRACT

One thousand eight hundred and eighty-four plots were established in NBDNR 1981 plantations. Overall survival one year after planting was 65% for bare root stock and 90% for paper pot stock.

The average planting density was 2 030 trees per hectare and the average density one year after planting was 1 640 trees per hectare. A significant portion of the area reported as plantation was in fact unplanted. Also a significant portion of the planted area had in excess of 3 000 trees per hectare.

The average first year height growth of spruce paper pot stock was greater than for spruce bare root stock. The average first year height growth of jack pine paper pot stock was less than for jack pine bare root stock. Larch paper pots more than doubled in height during the first year. Measurements of height growth are not as reliable as they should be because of animal browsing on the planted seedlings.

TABLE OF CONTENTS


| | | Page |
|---|---|---|
| ABSTRACT | | i |
| LIST OF TABLES | | iii |
| LIST OF FIGURES | | iii |
| INTRODUCTION | | 1 |
| METHODS | | 2 |
| RESULTS AND DISCUSSION | | 3 |
| CONCLUSIONS | | 6 |
| APPENDIX I | FIRST YEAR SURVIVAL, DENSITIES AND HEIGHTS OF 1981 PLANTATIONS | 16 |
| APPENDIX II | REGION BOUNDARIES | 22 |

## LIST OF TABLES


| | | Page |
|---|---|---|
| Table 1 | Survival in percent one year after planting by species and stock type for 1981 plantations | 7 |
| Table 2 | 1981 plantation areas by stock type, species, region and survival class | 8 |
| Table 3 | Height at time of planting and after one year by species and stock type for 1981 plantations | 10 |


## LIST OF FIGURES


| | | |
|---|---|---|
| Figure 1 | Percent of plots versus number of planted trees per hectare at time of planting - Region I | 11 |
| Figure 2 | Percent of plots versus number of planted trees per hectare at time of planting - Region II | 12 |
| Figure 3 | Percent of plots versus number of planted trees per hectare at time of planting - Region III | 13 |
| Figure 4 | Percent of plots versus number of planted trees per hectare at time of planting - Region IV | 14 |
| Figure 5 | Percent of plots versus number of planted trees per hectare at time of planting - Region V | 15 |

# INTRODUCTION

The province of New Brunswick has had an active tree planting program on Crown Land since the early sixties. In 1974, with the aid of federal funding through a Federal-Provincial Agreement the program began to expand rapidly, reaching 28.6 million seedlings in 1981. With the expanding planting program came the need for a monitoring system which would serve as a feedback for all other aspects of the reforestation program and would assist in predicting plantation development.

Originally each forest region was responsible for monitoring its own plantations but in 1977 the Forest Management Branch assumed responsibility for monitoring all plantations on Crown Land. Monitoring during the establishment stage (0 - 3 years) is concerned primarily with survival rates, initial height growth and planting densities. Plots are established shortly after planting and are remeasured after the first and third years. Starting at age five, growth and development are monitored at five year intervals.

The results of the assessment of 1977 to 1980 plantations have been reported previously. This report contains information on planting densities, height and first year survival of 1981 plantations.

## METHODS

Planting areas were mapped and stratified into "assessment blocks" by planting supervisors. Assessment crews established 5 metre radius plots in the blocks so as to give a representative sampling of the area. One thousand eight hundred and eighty-four plots were established in 11 490 hectares of 1981 plantations.

Within the plots each planted tree was staked, numbered and measure for height. The plots were remeasured in 1982. Density and height at planting, and survival, density and height after one year were calculated.

## RESULTS AND DISCUSSION

Appendix I lists the survival, density and height information for all plantations by region. Prior to 1983 results of first year assessment and maps of plot locations were sent to Regional Resource Managers for their use (fill planting decisions, etc.).

### SURVIVAL

Overall survival one year after planting was 90 percent for paper pot stock and 65 percent for bare root stock. The trend of lower survival of bare root stock was consistent between regions and between species (Table 1). Forty percent of the area planted with bare root stock had survival rates below 60% as compared with only 5 percent of the area planted with paper pot stock (Table 2). Mortality in bare root stock occurred on all microsites whereas heavy mortality in paper pot stock was related to sever microsite problems (eg. flooding).

Nursery practices have been changed in an effort to improve the quality of bare root stock leaving the nursery. The changes include lower densities in the seed beds and heavier culling. Bare root stock also requires careful handling after it leaves the nursery to ensure the trees are not expose to heat or moisture stress before planting.

DENSITY

In 1981 plantations the average planting density was 2 030 trees per hectare and the average density one year after planting was 1 640 trees per hectare. The NBDNR guide to licensees is to plant 2 000 trees per hectare with a minimum acceptable standard of 1 650 planted trees per hectare in the year of establishment.

However averages do not give the entire picture. Figures 1 - 5 show the distribution of plots in each density class at the time of planting. Based on the departments resource regions between 4 percent and 14 percent of the plots did not have any trees. This represents areas that were included in the plantation but were not planted either because they were missed by the planters or because they were unplantable. Care during harvesting and site preparation will ensure that the maximum area is plantable and adequate supervision of the planters will keep the missed areas to a minimum. However there will still be areas that are not planted. Accurate mapping is important to give a realistic indication of the area planted.

The "Forest Management Manual for Crown Lands" specifies that plantations are to have at least 1 500 but not more than 3 000 trees per hectare at year five (including acceptable natural regeneration). If we consider 3 000 trees per hectare as the maximum number that should be planted then based on NBDNR resource regions between 7 percent and 22 percent of the plots in 1981 plantations showed overdense planting (Figures 1-5). This represents not only a waste of planting resources but also may increase

the plantations tending cost. Good supervision with careful planting procedures should keep the overdense planting to a minimum.

## HEIGHTS

Table 3 shows the average heights of 1981 seedlings at the time of planting and after one year. In general, spruce bare root stock was taller when planted but container stock grew faster making up some of the difference by the end of the first year. Jack pine bare root stock grew faster than jack pine paper pot stock. Browse damage occurred on all species so the actual growth by the seedlings may be considerable more than the difference in height between original year and first year.

## CONCLUSION

Survival of paper pot stock continues to be good. There have been problems with bare root stock but measures have been taken to rectify the problems. There have been problems achieving the desired density throughout the plantation but the problems are being worked on. Except for jack pine, paper pot stock is showing more rapid initial growth than bare root stock. Browse by animals is affecting growth performance.

Table 1. Survival in percent one year after planting by species and stock type for 1981 plantations

| Region | Black Spruce | | White Spruce | | Jack Pine | | Red Pine | Larch |
|---|---|---|---|---|---|---|---|---|
| | BR[1] | PP[2] | BR | PP | BR | PP | BR | PP |
| 1 | 59 | 94 | 63 | - | 67 | 88 | - | - |
| 2 | 69 | 84 | - | 90 | - | 92 | - | - |
| 3 | 63 | 91 | 59 | 97 | 50 | 84 | - | - |
| 4 | 79 | 91 | 74 | 95 | - | 89 | 77 | 83 |
| 5 | - | 92 | 66 | - | - | 95 | - | 86 |
| Prov | 65 | 91 | 65 | 94 | 67 | 88 | 77 | 84 |

[1]Bare root stock
[2]Paper pot stock
[3]Styroblock stock

Table 2. 1981 Plantation areas[A] by stock type, species, region and survival class

| Stock Type | Species | Region | Survival Classes | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 100 - 91% | | 90 - 81% | | 80 - 61% | | 60 - 41% | | <40% | | |
| Paper Pot | Larch | 4 | 31[B] | (34)[C] | 25 | (27) | 25 | (27) | 7 | (8) | 4 | (4) | 92 |
| | Black Spruce | 1 | 357 | (78) | 80 | (18) | 15 | (3) | 0 | (0) | 2 | (0) | 453 |
| | | 2 | 173 | (33) | 140 | (27) | 192 | (36) | 23 | (4) | 0 | (0) | 528 |
| | | 3 | 421 | (63) | 149 | (22) | 84 | (13) | 10 | (1) | 5 | (1) | 670 |
| | | 4 | 320 | (77) | 47 | (11) | 26 | (6) | 15 | (4) | 6 | (1) | 414 |
| | | 5 | 412 | (67) | 141 | (23) | 56 | (9) | 3 | (0) | 3 | (0) | 615 |
| | | Total | 1683 | (63) | 557 | (21) | 375 | (14) | 50 | (2) | 16 | (1) | 2681 |
| | White Spruce | 2 | 73 | (64) | 17 | (15) | 23 | (20) | 0 | (0) | 0 | (0) | 113 |
| | | 3 | 39 | (92) | 4 | (8) | 0 | (0) | 0 | (0) | 0 | (0) | 43 |
| | | 4 | 329 | (92) | 21 | (6) | 4 | (1) | 4 | (1) | 0 | (0) | 357 |
| | | Total | 442 | (86) | 41 | (8) | 27 | (5) | 4 | (1) | 0 | (0) | 513 |
| | Jack Pine | 1 | 227 | (50) | 134 | (30) | 68 | (15) | 17 | (4) | 7 | (2) | 452 |
| | | 2 | 477 | (67) | 182 | (25) | 56 | (8) | 0 | (0) | 0 | (0) | 715 |
| | | 3 | 412 | (37) | 297 | (27) | 202 | (18) | 117 | (9) | 108 | (10) | 1137 |
| | | 4 | 341 | (67) | 82 | (16) | 49 | (10) | 21 | (4) | 16 | (3) | 510 |
| | | 5 | 17 | (84) | 3 | (16) | 0 | (0) | 0 | (0) | 0 | (0) | 20 |
| | | Total | 1474 | (52) | 698 | (25) | 375 | (13) | 155 | (5) | 131 | (5) | 2833 |
| Paper Pot | Summary | | 3630 | (59) | 1321 | (22) | 802 | (13) | 216 | (3) | 151 | (2) | 6119 |

Table 2. (cont'd)

| Stock Type | Species | Region | Survival Classes | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | 100 - 91% | 90 - 81% | 80 - 61% | 60 - 41% | < 40% | |
| Bare Root | Black Spruce | 1 | 34 (5) | 56 (9) | 214 (34) | 213 (34) | 117 (19) | 634 |
| | | 2 | 106 (17) | 92 (15) | 203 (33) | 120 (20) | 88 (14) | 610 |
| | | 3 | 17 (11) | 30 (19) | 35 (23) | 30 (19) | 42 (27) | 154 |
| | | 4 | 35 (26) | 32 (25) | 34 (26) | 31 (23) | 0 (0) | 132 |
| | | Total | 192 (13) | 211 (14) | 486 (32) | 394 (26) | 248 (16) | 1531 |
| | White Spruce | 1 | 9 (8) | 21 (20) | 29 (28) | 32 (30) | 16 (15) | 107 |
| | | 3 | 4 (2) | 37 (17) | 73 (34) | 58 (27) | 46 (21) | 217 |
| | | 4 | 44 (20) | 32 (15) | 101 (47) | 26 (12) | 14 (6) | 217 |
| | | 5 | 21 (8) | 28 (11) | 93 (37) | 67 (27) | 42 (17) | 251 |
| | | Total | 77 (10) | 117 (15) | 297 (37) | 183 (23) | 118 (15) | 792 |
| | Red Pine | 4 | 3 (7) | 11 (31) | 17 (47) | 5 (15) | 0 (0) | 36 |
| | Jack Pine | 1 | 5 (10) | 5 (10) | 18 (38) | 12 (26) | 7 (16) | 46 |
| Bare Root | Summary | | 277 (12) | 343 (14) | 816 (34) | 592 (25) | 372 (15) | 2405 |

A - includes only plantations in which assessment blocks were established
B - hectares
C - percent of region total

Table 3. Height at time of planting and after one year, by species and stock type for 1981 plantations.[A]

| Region | | Black Spruce | | White Spruce | | Jack Pine | | Red Pine | Larch |
|---|---|---|---|---|---|---|---|---|---|
| | | BR[1] | PP[2] | BR | PP | BR | PP | BR | PP |
| 1 | ORIG* | 25 | 15 | 20 | - | 19 | 6 | - | - |
| | 1st Yr+ | 28 | 24 | 21 | - | 35 | 13 | - | - |
| 2 | ORIG | 23 | 12 | - | 13 | - | 14 | - | - |
| | 1st Yr | 26 | 21 | - | 16 | - | 23 | - | - |
| 3 | ORIG | 24 | 10 | 19 | 8 | - | 9 | - | - |
| | 1st Yr | 25 | 15 | 20 | 7 | - | 13 | - | - |
| 4 | ORIG | 19 | 12 | 20 | 12 | - | 11 | 21 | 11 |
| | 1st Yr | 19 | 13 | 20 | 14 | - | 20 | 22 | 24 |
| 5 | ORIG | - | 11 | 17 | - | - | 8 | - | 7 |
| | 1st Yr | - | 17 | 18 | - | - | 21 | - | 25 |
| Prov. | ORIG | 23 | 12 | 19 | 12 | 19 | 10 | 21 | 10 |
| | 1st Yr | 25 | 18 | 19 | 14 | 35 | 18 | 22 | 24 |

1 Bare root stock type
2 Paper pot stock type
* Height in cm at time of planting
+ Height in cm one year after planting
A Browse damage was noted on all species

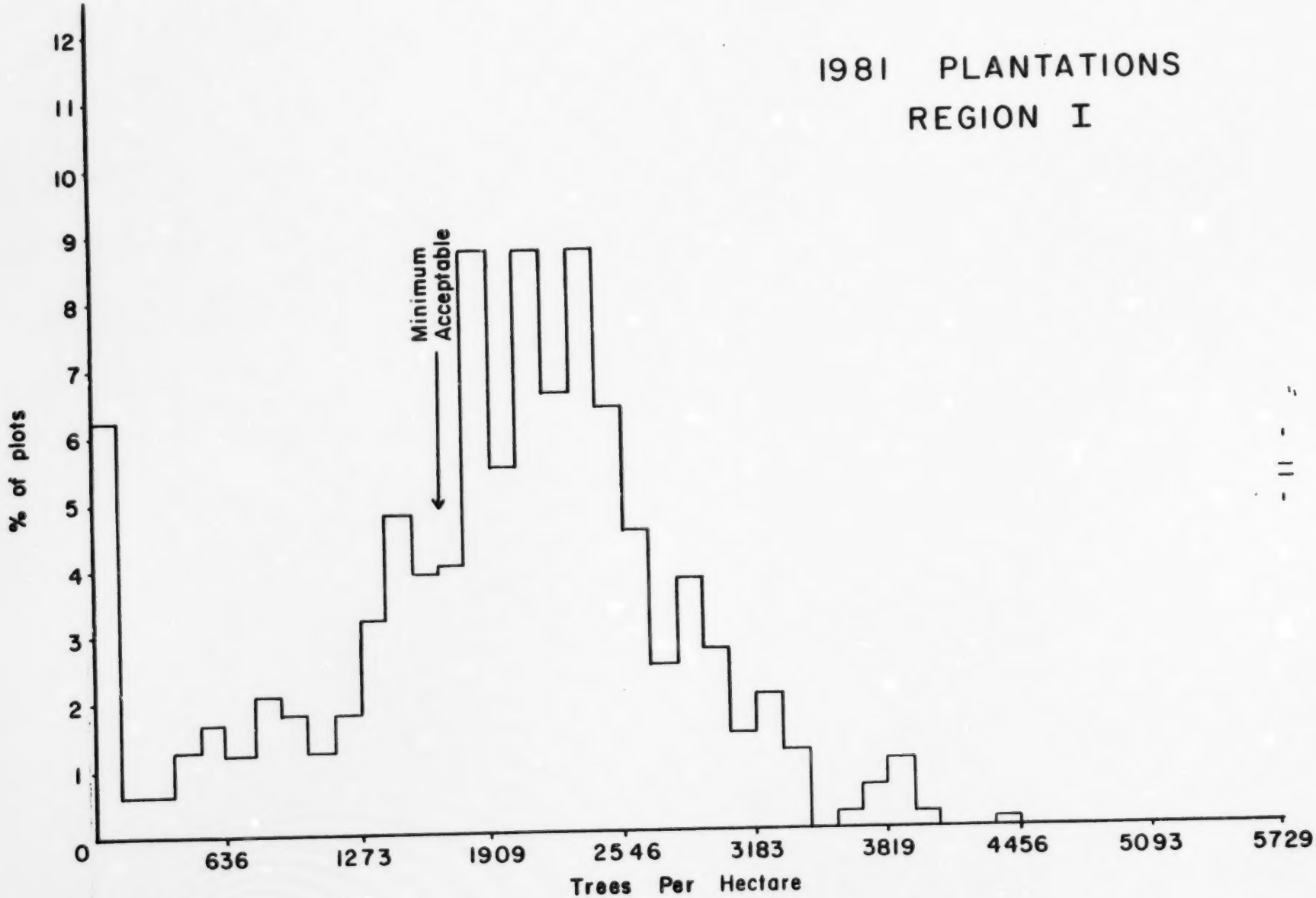



FIGURE I - Percent of plots versus number of planted trees per hectare at time of establishment - Region I

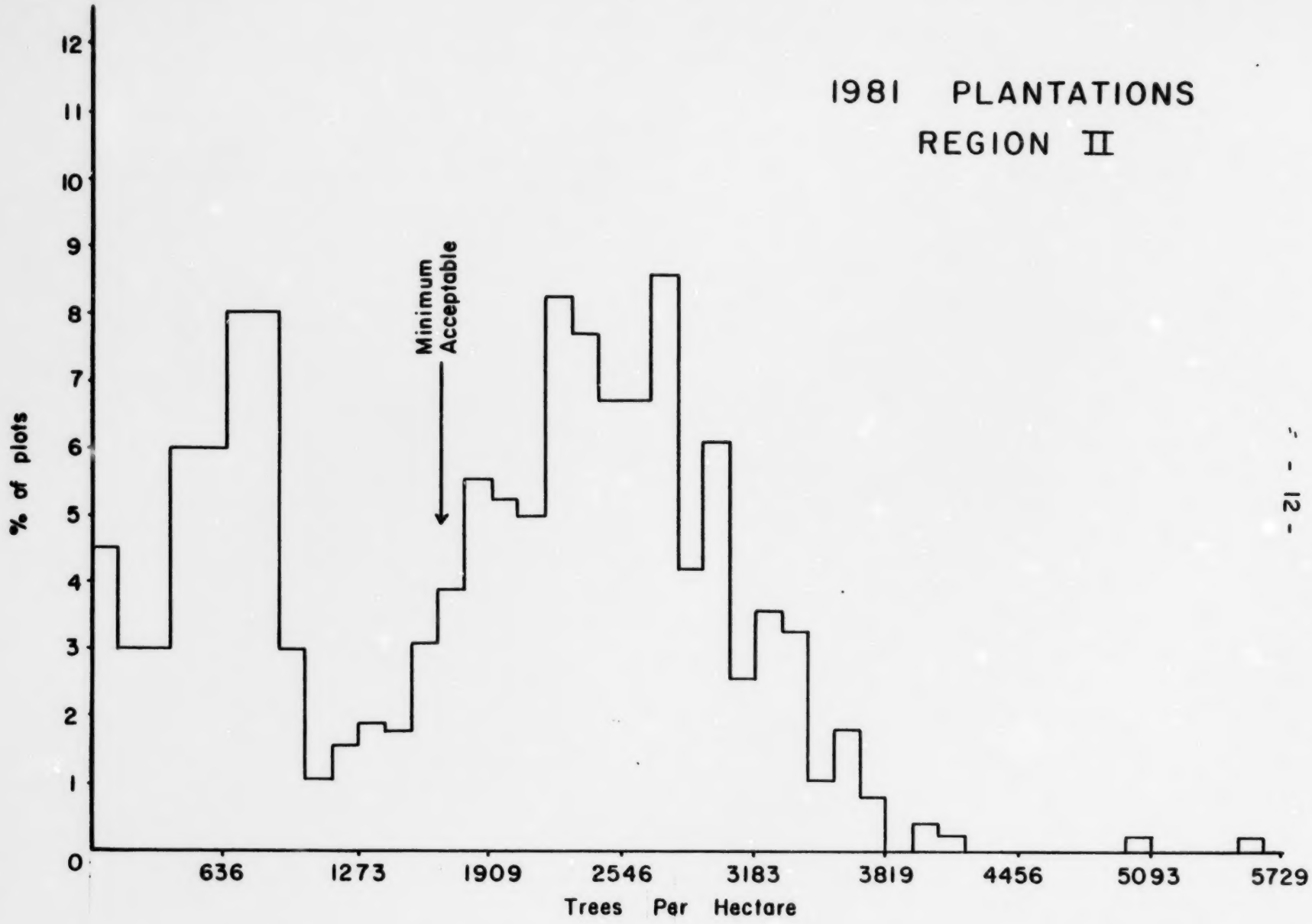



FIGURE II - Percent of plots versus number of planted trees per hectare at time of establishment - Region II

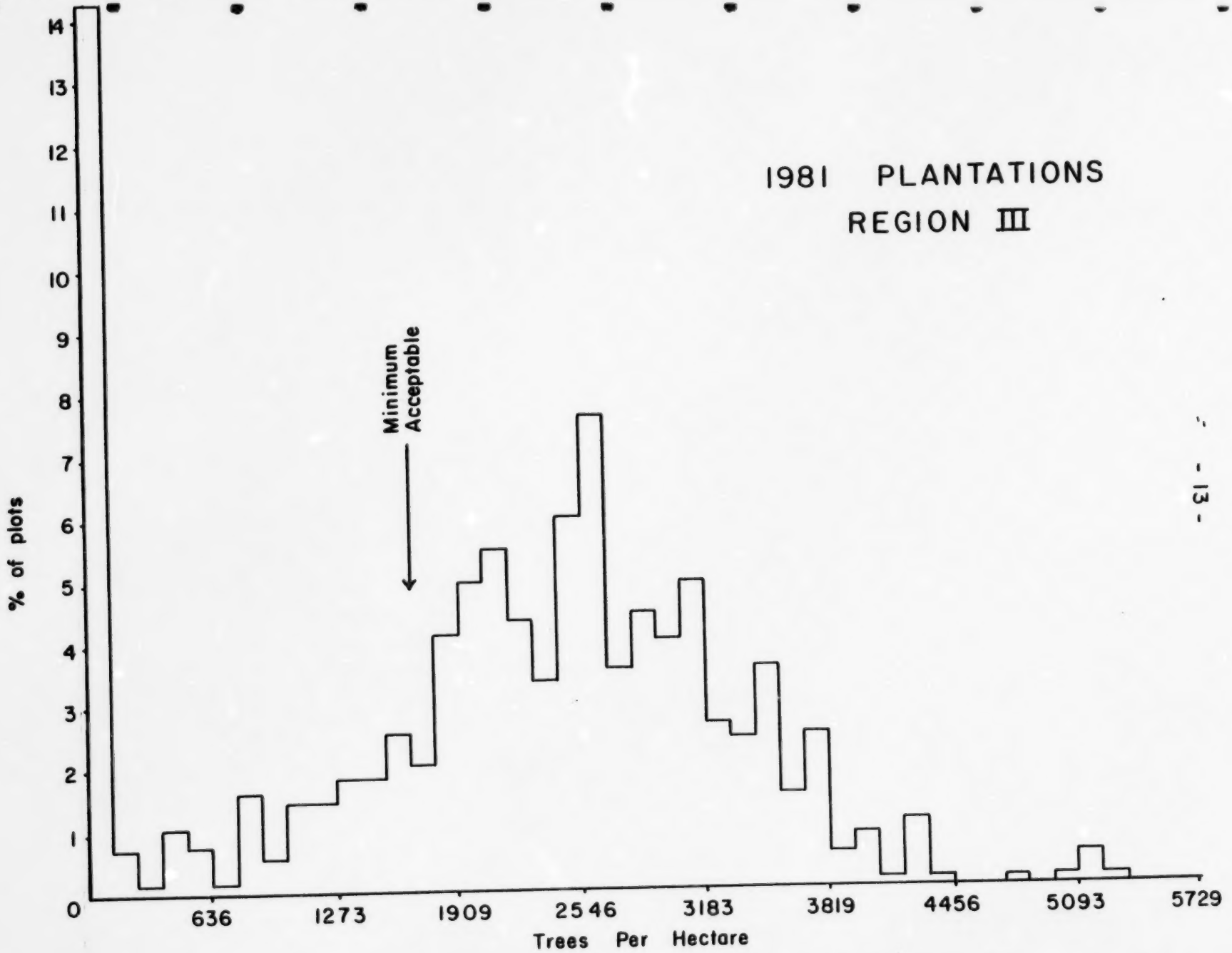



FIGURE III - Percent of plots versus number of planted trees per hectare at time of establishment - Region III

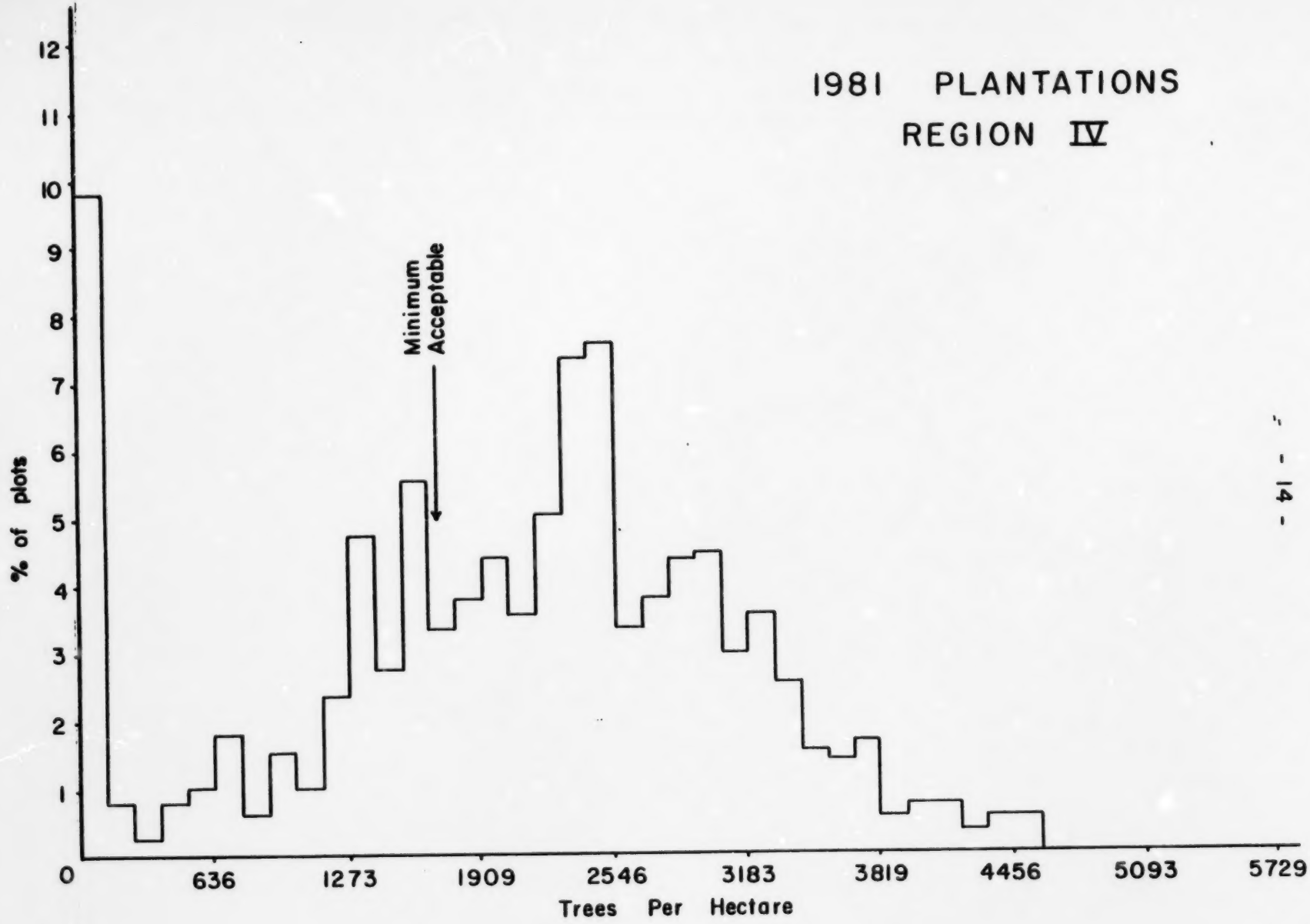



FIGURE IV - Percent of plots versus number of planted trees per hectare at time of establishment - Region IV

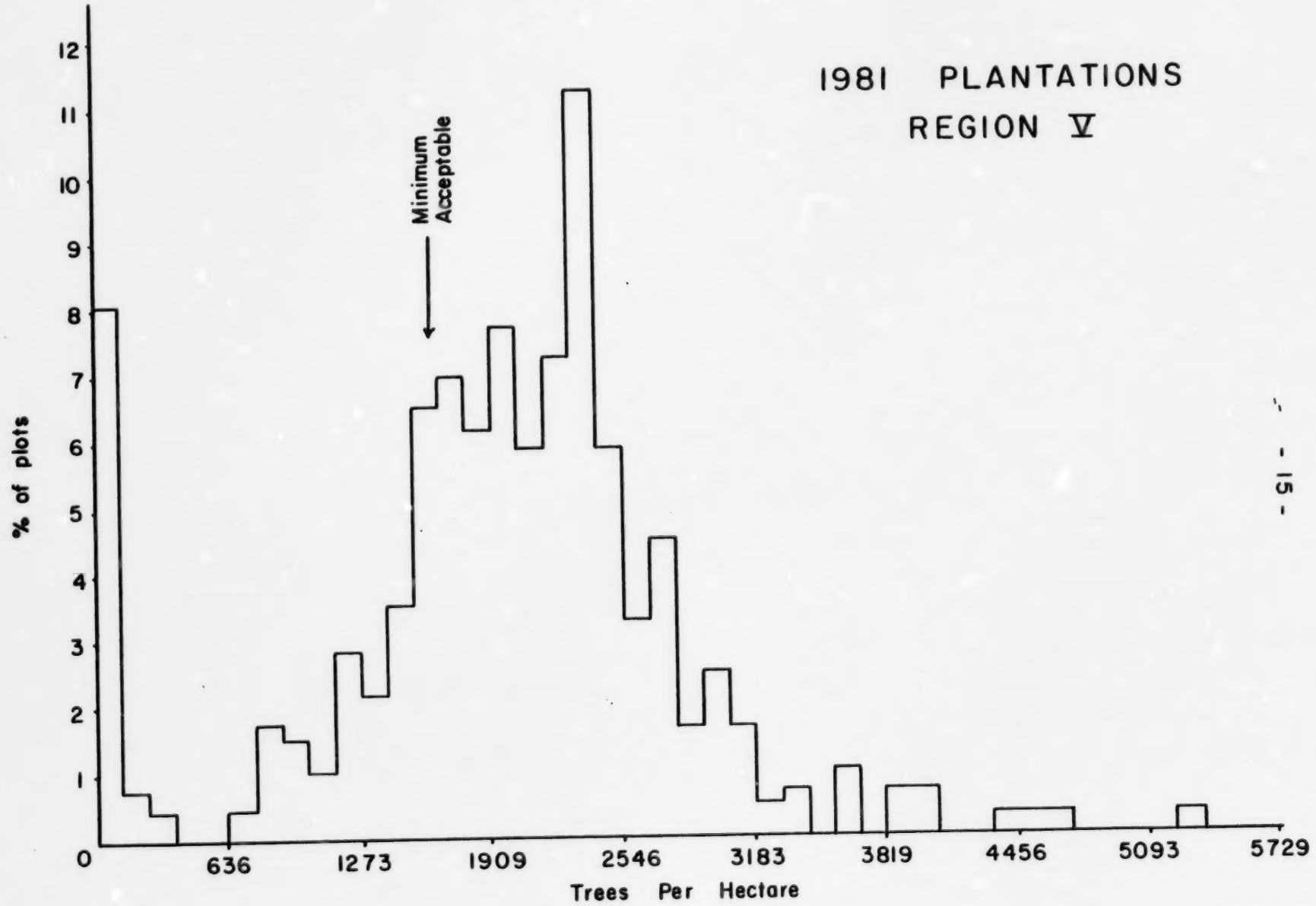



FIGURE V - Percent of plots versus number of planted trees per hectare at time of establishment - Region V

## APPENDIX I

First Year survival, densities and heights
of 1981 Plantations

| Region | Plantation | Site Preparation | Area (ha) | Species | Stock Type | Original Year Density (trees/ha) | Original Year Ht (cm) | First Year Survival (%) | First Year Density (trees/ha) | First Year Ht (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| I | P-6-81 | Burn & Disc Trencher | 105 | bs | br | 1440 | 24 | 69 | 990 | 27 |
| | P-8-81 | Burn & Disc Trencher | 57 | bs | br | 1640 | 25 | 63 | 1030 | 26 |
| | P-9-81 | C & H Plow | 71 | bs | br | 2600 | 25 | 62 | 1620 | 29 |
| | P-10-81 | Bracke | 23 | bs | br | 1630 | 26 | 70 | 1150 | 27 |
| | P-11-81 | Disc Trencher | 41 | bs | br | 1930 | 27 | 66 | 1270 | 30 |
| | P-12-81 | Disc Trencher | 22 | bs | br | 1110 | 27 | 52 | 580 | 29 |
| | P-13-81 | Burn & Disc Trencher | 31 | bs | br | 1260 | 26 | 54 | 680 | 28 |
| | P-14-81 | C & H Plow | 56 | bs | br | 2220 | 25 | 50 | 1110 | 28 |
| | P-15-81 | Burn & Disc Trencher | 26 | bs | br | 1780 | 26 | 50 | 890 | 26 |
| | | | | bs | pp | 2290 | 15 | 94 | 2160 | 20 |
| | | | | jp | br | 1620 | 19 | 75 | 1220 | 38 |
| | P-16-81 | Burn & Disc Trencher | 28 | bs | br | 1880 | 26 | 69 | 1290 | 30 |
| | | | | jp | br | 1540 | 18 | 73 | 1120 | 32 |
| | P-17-81 | Barrels & Chains | 48 | bs | br | 1270 | 23 | 48 | 610 | 24 |
| | | | | ws | br | 1470 | 21 | 39 | 570 | 21 |
| | P-18-81 | Barrels & Chains | 102 | bs | br | 2850 | 26 | 52 | 1500 | 30 |
| | | | | ws | br | 1790 | 20 | 64 | 1150 | 21 |
| | P-19-81 | Barrels & Chains | 46 | bs | br | 1570 | 23 | 41 | 640 | 24 |
| | P-20-81 | Barrels & Chains | 9 | bs | br | 2020 | 23 | 43 | 870 | 25 |
| | FP-1-81 | Finnish Plow | 72 | bs | br | 2820 | 28 | 65 | 1840 | 30 |
| | | | | bs | pp | 1300 | 14 | 97 | 1260 | 15 |
| | | | | bs Orig | br | 2490 | 49 | 97 | 2420 | 51 |
| | FP-2-81 | Finnish Plow | 14 | bs | pp | 1950 | 17 | 97 | 1900 | 18 |
| | | | | bs Orig | br | 2120 | 52 | 100 | 2120 | 55 |
| | FP-3-81 | Bracke or Finnish Plow | 64 | bs | br | 1670 | 27 | 66 | 1110 | 29 |
| | | | | bs Orig | br | 3020 | 16 | 97 | 2940 | 19 |
| | | | | jp Orig | br | 2820 | 21 | 100 | 2820 | 18 |
| | TP-10-81 | Burn & Disc Trencher | 68 | bs | br | 2240 | 27 | 45 | 1020 | 31 |
| | | | | bs | pp | 2200 | 13 | 94 | 2070 | 25 |
| | | | | jp | br | 2240 | 19 | 45 | 1020 | 35 |

| Region | Plantation | Site Preparation | Area (ha) | Species | Stock Type | Original Year | | First Year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Density (trees/ha) | Ht (cm) | Survival (%) | Density (trees/ha) | Ht (cm) |
| I | TP-24-81 | Barrels & Chains | 96 | jp | pp | 1910 | 10 | 94 | 1800 | 17 |
| | TP-28-81 | Barrels & Chains | 73 | bs | pp | 2160 | 15 | 96 | 2070 | 25 |
| | TP-29-81 | Barrels & Chains | 86 | bs | pp | 2180 | 15 | 95 | 2080 | 23 |
| | TP-30-81 | Barrels & Chains | 95 | bs | pp | 2130 | 16 | 95 | 2010 | 25 |
| | TP-31-81 | Barrels & Chains | 97 | bs | pp | 2320 | 16 | 89 | 2080 | 24 |
| | TP-36-81 | Barrels & Chains | 70 | bs | pp | 1720 | 21 | 84 | 1450 | 27 |
| | | | | jp | pp | 1910 | 6 | 87 | 1670 | 14 |
| | TP-37-81 | Barrels & Chains | 175 | jp | pp | 1720 | 6 | 83 | 1420 | 13 |
| | TP-42-81 | Burn & Disc Trencher | 118 | jp | pp | 1880 | 6 | 90 | 1690 | 12 |
| II | TP-125-81 | Finnish Plow | 520 | jp | pp | 2070 | 10 | 93 | 1920 | 20 |
| | TP-126-81 | Finnish Plow | 197 | bs | pp | 1950 | 12 | 91 | 1780 | 17 |
| | TP-127-81 | Burn | 39 | bs | pp | 2290 | 13 | 82 | 1880 | 29 |
| | | | | jp | pp | 2270 | 21 | 88 | 2000 | 30 |
| | TP-128-81 | Burn | 302 | bs | pp | 2040 | 12 | 80 | 1620 | 24 |
| | TP-129-81 | Burn | 20 | bs | pp | 2040 | 20 | 78 | 1590 | 20 |
| | TP-130-81 | Burn | 162 | jp | pp | 2620 | 19 | 93 | 2440 | 26 |
| | TP-131-81 | Finnish Plow | 726 | bs | br | 2400 | 23 | 69 | 1660 | 26 |
| | | | | ws | pp | 1960 | 13 | 90 | 1770 | 16 |
| III | P-1-81 | C & H Plow | 131 | bs | br | 2580 | 24 | 65 | 1680 | 26 |
| | | | | ws | br | 2710 | 19 | 49 | 1340 | 22 |
| | P-3-81 | C & H Plow | 27 | bs | br | 2800 | 25 | 53 | 1480 | 24 |
| | | | | ws | br | 1980 | 24 | 60 | 1190 | 26 |
| | P-4-81 | Barrels & Chains | 74 | ws | br | 1940 | 18 | 56 | 1080 | 19 |
| | P-5-81 | Barrels & Chains | 23 | ws | br | 0 | - | - | - | - |
| | P-001-81 | C & H Plow | 92 | bs | br | 1630 | 20 | 61 | 1000 | 20 |
| | | | | ws | br | 2550 | 20 | 61 | 1560 | 19 |
| | P-003-81 | C & H Plow | 18 | ws | br | 800 | 18 | 66 | 520 | 18 |
| | TP-2-81 | C & H Plow | 54 | jp | pp | 2460 | 12 | 75 | 1850 | 11 |
| | TP-3-81 | C & H Plow | 20 | jp | pp | 1950 | 16 | 92 | 1780 | 17 |

| Region | Plantation | Site Preparation | Area (ha) | Species | Stock Type | Original Year Density (trees/ha) | Original Year Ht (cm) | First Year Survival (%) | First Year Density (trees/ha) | First Year Ht (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| III | TP-4-81 | Finnish Plow | 37 | jp | pp | 2820 | 14 | 100 | 2820 | 14 |
| | TP-5-81 | C & H Plow | 127 | bs | pp | 2230 | 12 | 97 | 2160 | 13 |
| | TP-7-81 | C & H Plow | 233 | bs | pp | 2490 | 9 | 86 | 2140 | 14 |
| | | | | jp | pp | 3330 | 8 | 56 | 1870 | 9 |
| | TP-8-81 | C & H Plow | 26 | bs | pp | 2120 | 13 | 93 | 1970 | 14 |
| | TP-9-81 | Barrels & Chains | 52 | ws | br | 840 | 18 | 67 | 570 | 17 |
| | | | | jp | pp | 2280 | 13 | 97 | 2210 | 15 |
| | TP-03-81 | C & H Plow | 87 | bs | pp | 2480 | 12 | 96 | 2380 | 10 |
| | TP-19-81 | Barrels & Chains | | bs | pp | 1920 | 9 | 91 | 1740 | 21 |
| | TP-20-81 | Barrels & Chains | 90 | jp | pp | 1690 | 7 | 81 | 1370 | 15 |
| | TP-21-81 | Barrels & Chains | 111 | jp | pp | 1250 | 6 | 84 | 1050 | 13 |
| | TP-002-81 | C & H Plow | 12 | bs | pp | 2960 | 11 | 97 | 2880 | 9 |
| | | | | jp | pp | 1700 | 16 | 35 | 600 | 10 |
| | TP-003-81 | C & H Plow | 43 | ws | pp | 1960 | 8 | 97 | 1900 | 7 |
| | TP-007-81 | C & H Plow | 761 | jp | pp | 2430 | 7 | 80 | 1940 | 12 |
| | TP-020-81 | Barrels & Chains | 37 | bs | pp | 2400 | 11 | 89 | 2150 | 20 |
| IV | P-30-81 | C & H Plow | 65 | bs | br | 2360 | 18 | 63 | 1490 | 18 |
| | P-31-81 | C & H Plow | 30 | ws | br | 2940 | 19 | 71 | 2080 | 17 |
| | P-32-81 | C & H Plow | 18 | rp | br | 3140 | 22 | 72 | 2280 | 21 |
| | P-33-81 | C & H Plow | 71 | ws | br | 3150 | 20 | 86 | 2720 | 19 |
| | P-38-81 | C & H Plow | 33 | ws | br | 2380 | 20 | 63 | 1510 | 21 |
| | | | | ws | pp | 1610 | 8 | 95 | 1530 | 17 |
| | P-39-81 | C & H Plow | 11 | bs | br | 2310 | 22 | 94 | 2180 | 22 |
| | P-40-81 | C & H Plow | 43 | bs | br | 2240 | 20 | 88 | 1970 | 19 |
| | P-41-81 | Barrels & Chains | 25 | ws | br | 1680 | 20 | 64 | 1080 | 22 |
| | P-42-81 | Barrels & Chains | 67 | ws | br | 1090 | 19 | 70 | 760 | 21 |
| | P-031-81 | C & H Plow | 15 | rp | br | 3690 | 19 | 78 | 2890 | 21 |
| | NRP* | C & H Plow | - | rp | br | 2360 | 24 | 85 | 2000 | 25 |

* not reported planted

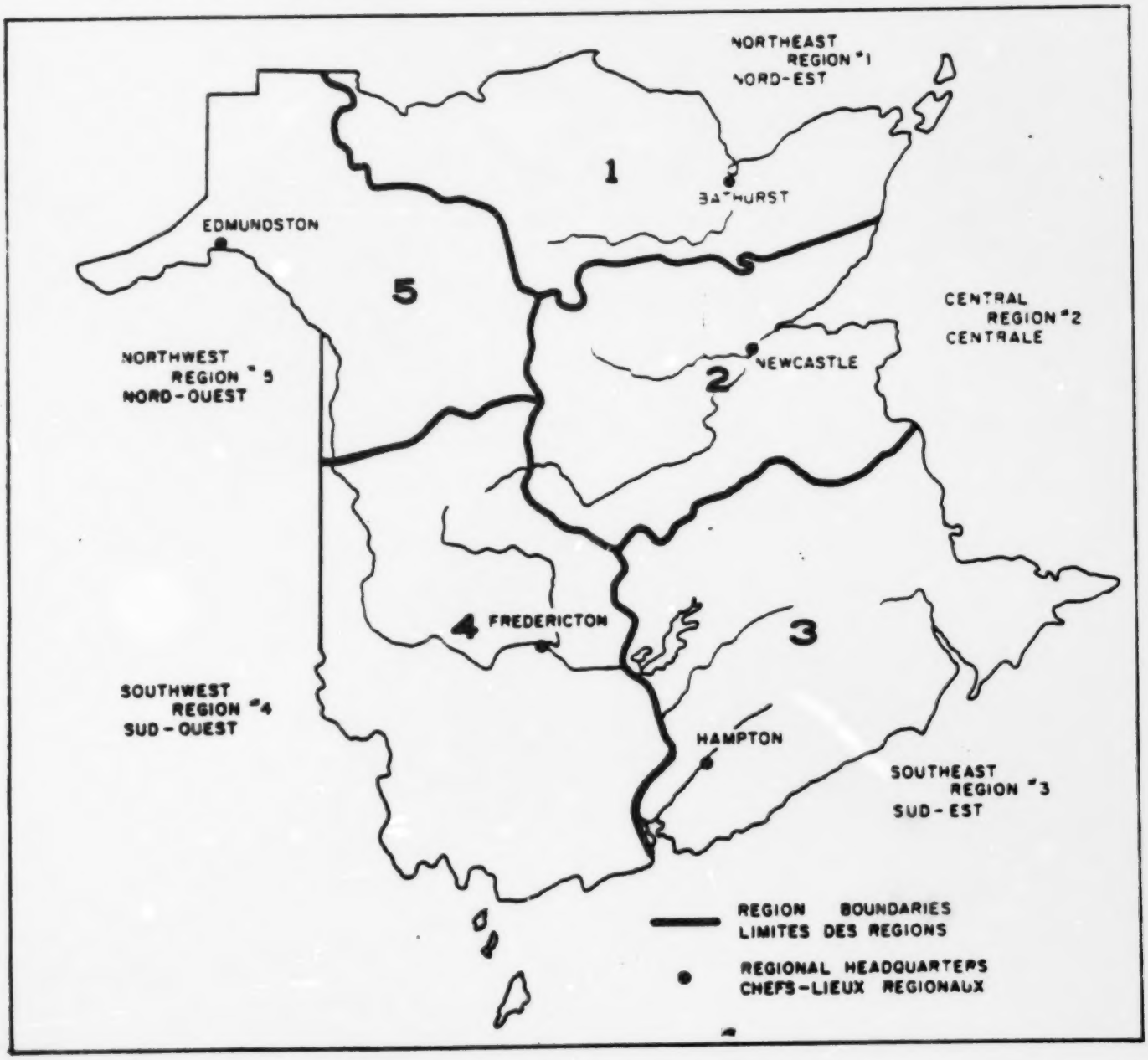
| Region | Plantation | Site Preparation | Area (ha) | Species | Stock Type | Original Year Density (trees/ha) | Original Year Ht (cm) | First Year Survival (%) | First Year Density (trees/ha) | First Year Ht (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| IV | TP-48-81 | C & H Plow | 83 | bs | pp | 0 | - | - | - | - |
| | TP-55-81 | C & H Plow | 19 | bs | br | 2860 | 18 | 87 | 2480 | 17 |
| | | | | ws | pp | 1210 | 8 | 95 | 1150 | 6 |
| | TP-56-81 | Barrels & Chains | 13 | bs | pp | 2590 | 12 | 96 | 2490 | 18 |
| | | | | ws | pp | 1960 | 13 | 98 | 1920 | 16 |
| | TP-98-81 | C & H Plow | 79 | bs | pp | 2620 | 14 | 95 | 2490 | 15 |
| | | | | ws | pp | 2550 | 9 | 95 | 2420 | 9 |
| | TP-100-81 | C & H Plow | 208 | bs | pp | 2620 | 12 | 97 | 2550 | 12 |
| | TP-102-81 | C & H Plow | 93 | jp | pp | 2820 | 15 | 83 | 2330 | 13 |
| | TP-103-81 | Burn&Barrels&Chains | 84 | jp | pp | 2480 | 9 | 93 | 2290 | 21 |
| | TP-105-81 | C & H Plow | 93 | L | pp | 1780 | 11 | 83 | 1470 | 24 |
| | TP-106-81 | Barrels & Chains | 162 | ws | pp | 1750 | 12 | 100 | 1750 | 21 |
| | TP-108-81 | Barrels & Chains | 123 | jp | pp | 1150 | 10 | 96 | 1100 | 24 |
| | TP-110-81 | Barrels & Chains | 40 | bs | pp | 960 | 5 | 92 | 880 | 12 |
| | TP-113-81 | Barrels & Chains | 119 | ws | pp | 1790 | 15 | 95 | 1700 | 16 |
| | TP-118-81 | Barrels & Chains | 209 | jp | pp | 700 | 9 | 92 | 650 | 24 |
| | TP-119-81 | No Site Prep | 86 | bs | pp | 1960 | 13 | 84 | 1640 | 14 |
| | TP-120-81 | No Site Prep | 10 | bs | pp | 2090 | 11 | 88 | 1830 | 12 |
| | TP-902-81 | C & H Plow | 39 | bs | pp | 2360 | 12 | 95 | 2260 | 8 |
| V | P-21-81 | C & H Plow | 17 | ws | br | 2220 | 16 | 78 | 1740 | 18 |
| | P-22-81 | C & H Plow | 5 | ws | br | 2160 | 17 | 91 | 2550* | 18 |
| | P-23-81 | C & H Plow | 98 | ws | br | 2410 | 19 | 54 | 1290 | 19 |
| | P-27-81 | Root Rake | 14 | ws | br | 2310 | 17 | 64 | 1470 | 16 |
| | P-28-81 | Root Rake | 21 | ws | br | 1600 | 15 | 69 | 1110 | 17 |
| | P-35-81 | Bracke | 16 | ws | br | 2230 | 18 | 79 | 1750 | 19 |
| | P-36-81 | Bracke | 45 | ws | br | 1680 | 18 | 69 | 1170 | 19 |
| | P-37-81 | Bracke | 27 | ws | br | 1270 | 16 | 60 | 760 | 17 |
| | NRP+ | Root Rake & Chains | - | ws | br | 2420 | 16 | 78 | 1880 | 17 |
| | TP-51-81 | Bracke | 15 | bs | pp | 1800 | 11 | 96 | 1740 | 11 |

* Some plots destroyed
\+ Not reported planted

| Region | Plantation | Site Preparation | Area (ha) | Species | Stock Type | Original Year Density (trees/ha) | Original Year Ht (cm) | First Year Survival (%) | First Year Density (trees/ha) | First Year Ht (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| V | TP-52-81 | Bracke | 80 | bs | pp | 2490 | 12 | 91 | 2260 | 14 |
| | TP-57-81 | Bracke | 68 | bs | pp | 1710 | 11 | 96 | 1630 | 13 |
| | TP-58-81 | Bracke | 37 | bs | pp | 1540 | 11 | 95 | 1460 | 15 |
| | TP-59-81 | Bracke | 22 | bs | pp | 1500 | 12 | 98 | 1470 | 16 |
| | TP-61-81 | Bracke | 52 | bs | pp | 1820 | 8 | 93 | 1690 | 9 |
| | TP-66-81 | C & H Plow | 65 | bs | pp | 1560 | 17 | 90 | 1400 | 25 |
| | TP-67-81 | C & H Plow | 134 | bs | pp | 1890 | 12 | 90 | 1700 | 22 |
| | TP-68-81 | C & H Plow | 17 | bs | pp | 2400 | 11 | 95 | 2270 | 24 |
| | TP-69-81 | C & H Plow | 42 | bs | pp | 2040 | 12 | 95 | 1930 | 21 |
| | TP-70-81 | C & H Plow | 22 | bs | pp | 1950 | 9 | 93 | 1800 | 25 |
| | TP-71-81 | C & H Plow | 21 | bs | pp | 2230 | 9 | 94 | 2100 | 23 |
| | TP-72-81 | C & H Plow | 40 | bs | pp | 1700 | 6 | 88 | 1500 | 16 |
| | TP-75-81 | Root Rake & Chains | 12 | jp | pp | 2000 | 8 | 98 | 1970 | 20 |
| | TP-76-81 | Root Rake & Chains | 8 | jp | pp | 1420 | 9 | 93 | 1320 | 21 |
| | TP-77-81 | C & H Plow | 2 | L | pp | 2050 | 7 | 86 | 1750 | 25 |
| | TP-79-81 | Disc Trencher | 34 | bs | pp | 0 | - | - | - | - |

APPENDIX II

# REGION BOUNDARIES
# DEPARTMENT OF NATURAL RESOURCES




# LIMITES DES REGIONS
# MINISTERE DES RESSOURCES NATURELLES